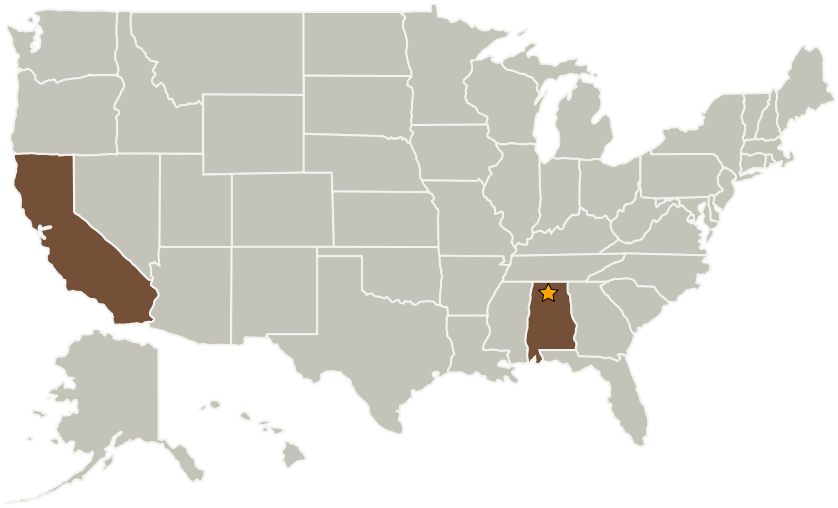
Gelled Propellants for Reduced Temperature Operation, Phase I

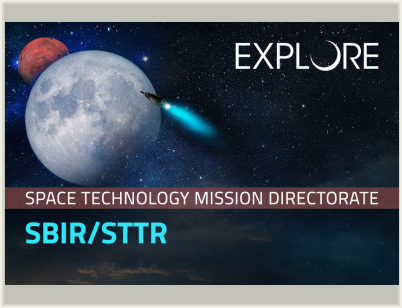
Completed Technology Project (2005 - 2005)

Project Introduction

This proposal is responsive to NASA 2004 SBIR objectives (under Topic X6.05) seeking gelled propellant formulations "for long-duration missions involving low-power consumption (i.e., minimal use of heaters)." EERGC Corporation, in cooperation with subcontractor Northrop Grumman Space and Technology (NGST) Propulsion Systems, proposes to develop gelled propellant formulations (and development methodologies) optimized for high combustion efficiency, storability at variable low temperatures including freezing conditions, and firing at reduced temperatures to minimize energy requirements for heat up prior to firing. The approach is an innovation as it enables loaded gels with optimized low-temperature performance. The gel formulations will be optimized with respect to composition of gellants, additives, and loading agents, as well as characteristic size of particulate ingredients. The approach will consider the tradeoff impacts of propellant formulation and loading particle size on maximum attainable loading, solid phase burnout, susceptibility to separation from thermal cycling, and ultimately combustion efficiency. The project is relevant as it improves the competitiveness of gelled bipropellants with equivalent liquids, while incorporating gels' safety and handling advantages. The proposed program takes gel technology beyond that developed by EERGC under prior and ongoing DoD and NASA programs.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Energy and Environmental Research Corp	Supporting Organization	Industry	Irvine, California

Primary U.S. Work Locations	
Alabama	California

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Mark Sheldon

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.6 Gels